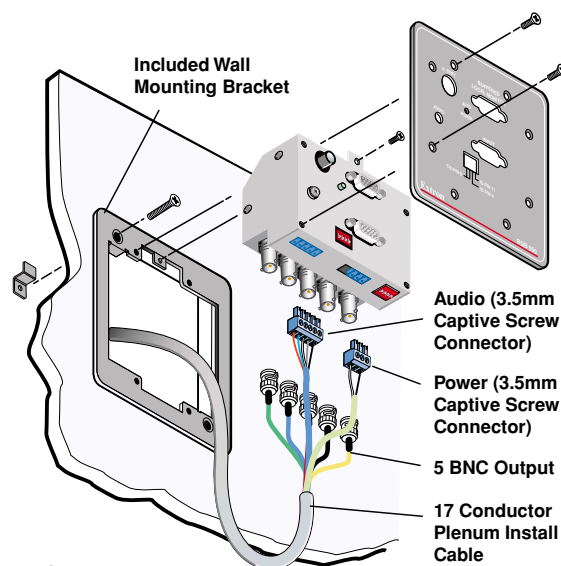


The Most Versatile Architectural Interfaces Ever! Extron's new RGB 500 Series with ADSPTM

Extron's new RGB 500 Series interfaces are designed to be the most advanced and versatile series of architectural interfaces ever. By using advanced technology, the RGB 500 Series interfaces overcome most of the limitations that can arise when using architectural interfaces. Limitations such as fitting them into an electrical box or very thin walls, or incompatibility with LCD/DLP/Plasma displays. Wouldn't you like to have the choice between using a universal 9-pin input connector or a standard 15-pin HD input connector? What about custom configuring auxiliary connections and two-unit side by side mounting? And then there's the challenge of integrating interfaces into the European electrical channels. If you have had to work around any of these limitations and have been faced with such chal-

*(continued on page 12—
See "RGB 500 Series")*



RGB 550

The RGB 550 with ADSPTM (Advanced Digital Sync Processing) is a universal, mountable HD 15 input interface that combines the flexibility found in all of Extron's Architectural Series products with our latest innovations in technology.

Extron's New Digital Video Scaler with PC, HDTV and Plasma Video Output Rates

Video technology has made leaps and bounds over the last decade. A good illustration of this is the evolution of digital display technology, i.e., LCD, DLP, Plasma and ILA. Only a few years ago LCD projectors were regarded as glorified carry-ons for the travelling presenter. Now, they take center stage in churches, educational facilities, boardrooms, control centers and many other high-end A/V installs.

Along with the improvement of display technology, video too will see its day of refinement. With the impending arrival of HDTV A/V professionals will soon be able to take advantage of the benefits better-looking video has to offer. With that in mind, Extron's new DVS 100 digital video scaler is about to catapult A/V system design into the year 2006.

(continued on page 2— See "DVS 100")



DVS 100

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DVS 100— continued from page 1

In 2006 all TV stations must be in conformity with the new HDTV format standards according to the FCC (Federal Communications Commission). So what does all this have to do with a video scaler? Nothing, unless the video scaler is the Extron DVS 100 with HDTV output rates. The DVS 100 provides three HDTV output rates including 480p, 720p and 1080p.

Pretty soon all those cool, futuristic looking displays with the 16:9 aspect ratio will no longer be an expensive novelty. They are increasingly becoming part of the techno-buzz lexicon; the "I got to have that" accessory amongst A/V professionals, home theater zealots and Fortune 500 executives alike. In fact, you too may long to hang a Plasma display right above the fireplace. But just because the digital bug has bitten does not mean we have to throw out all of the existing analog-based components. The key is to bring systems up to speed by incorporating new products that convert standard NTSC/PAL/SECAM video into something we can really use for digital displays; something that provides the video quality we desire.

WHAT THE DVS 100 DOES

The abridged definition of a scaler is a device that 'up-converts', or 'scales up', interlaced NTSC/PAL/SECAM video to non-interlaced RGB video. Similar to a computer's video output, non-interlaced video provides greater resolution and a video image that far surpasses interlaced video quality. In this conversion process, the DVS 100 up-converts standard video resolutions to computer-video, progressive HDTV or Plasma resolutions. Standard video is scaled up to computer-video refresh rates of 60 Hz and 75 Hz at resolutions of 640 x 480, 800 x 600, 832 x 624, 1024 x 768 and 1280 x 1024. HDTV output rates include 480p, 720p and 1080p. And to match the resolutions and timings of Plasma displays from Fujitsu, NEC, Pioneer, and others, the DVS 100 provides Plasma output rates including 852 x 480, 848 x 480, 1280 x 768 and 1360 x 765.

Extron's DVS 100 optimizes the video signal for a given display's "sweet spot." The sweet spot, or native resolution, is a

specific resolution for which the projector best performs. Digital displays are somewhat finicky and require specific resolutions and video signals to output the best picture. Typically, the desired resolutions are in the ranges of 640 x 480 up to 1280 x 1024 with signals decoded into separate RGBHV. Resolutions are scaled up by taking the horizontal & vertical sync timing, and number of lines from the standard video input, then converting them into higher resolution formats. The scaling method used by Extron's DVS 100 provides exceptional motion compensation so moving video images have "jaggie-free," smooth edges.

DVS 100

Not only does the DVS 100 scale video, it also de-interlaces the signal so that the number of lines is expanded. Expanded lines provide two benefits: a brighter picture and absence of distortion. More visible lines mean more pixels are illuminated—which gives you a brighter picture. More visible lines also mean that the information is able to fill the screen both horizontally and vertically eliminating image distortion.

INPUTS, OUTPUTS AND DECODING

As mentioned, most digital displays like to see separate RGBHV. However, most installations, if not all, are using one or more forms of standard video, i.e., composite, S-video or component. The DVS 100 accepts all three of these video-input formats and decodes them. The scaled output is provided simultaneously in RGBHV on a 15-pin HD connector and RGBHV, RGBS or RGsB on six BNCs.

Standard video has a tendency to contain chroma noise and artifact. To help eliminate these image impairments, the DVS 100 uses a high quality decoder with a three-line adaptive comb filter for Y/C separation. This ensures a more clean, stable image. Additionally, the DVS 100's decoder is quad-standard and therefore compatible with NTSC, NTSC 4.43, PAL and SECAM.

VARIABLE BLANKING

The DVS 100's variable top and bottom vertical blanking gives you control over

how your image will appear on a display screen. Not all of the video input's lines are used for image information. Some of the lines at the top and bottom, the blanking lines, are used to encode other information, such as closed-captioning. With variable top and bottom vertical blanking, the user can add black lines at the top and bottom of the screen until all of the edge noise is eliminated. Therefore, LCD, DLP, Plasma and other display devices are able to display images true to their original detail.

(continued on next page)

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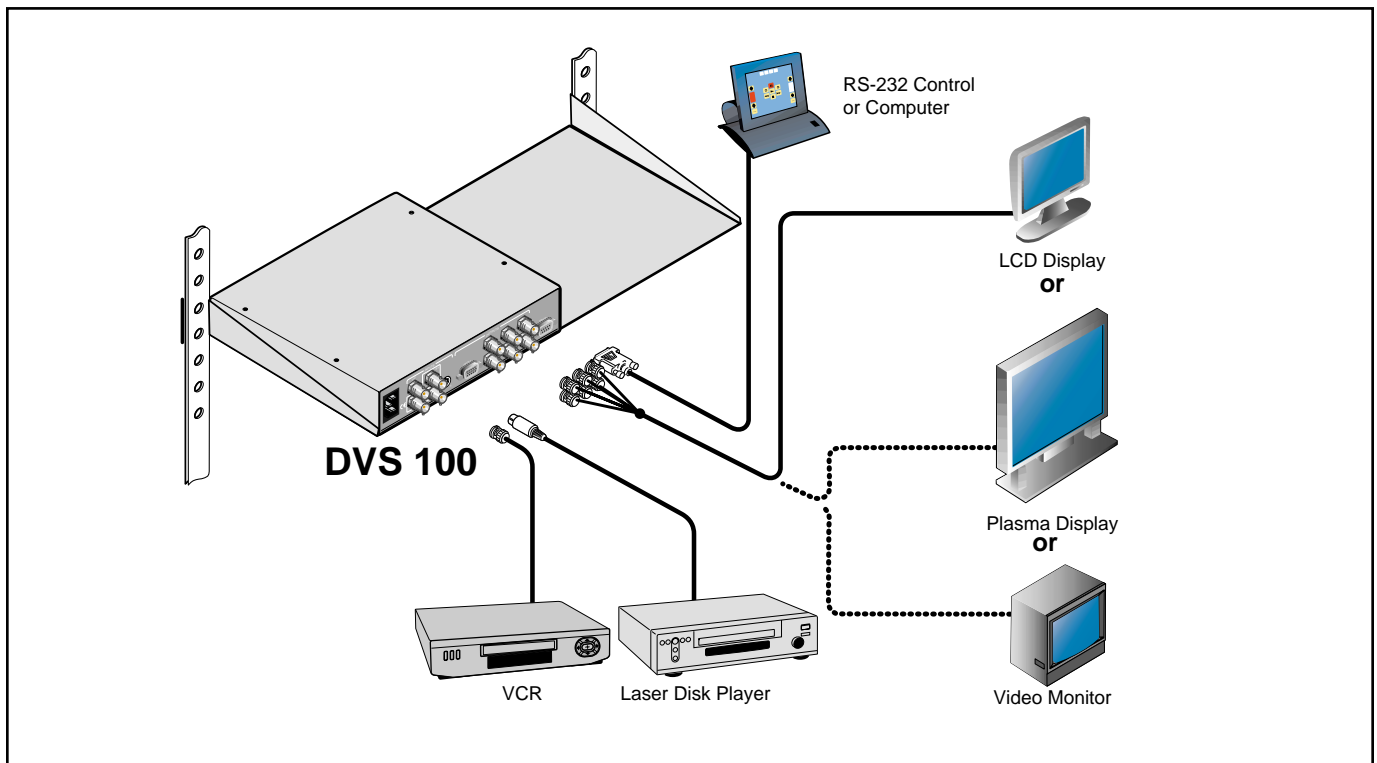
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DVS 100 Application Diagram

SYSTEM DESIGN

The DVS 100 was designed as an integral component to an A/V system. It comes in a rack mountable, metal enclosure and provides an internal (100-240 VAC, 50/60 Hz) auto-switchable power supply. It provides RS-232, contact closure and front panel control. RS-232 control may be achieved through Extron's own Simple Instruction Set (SIS™) or a Windows®-based control program. The DVS 100 also has two non-volatile memory inputs for storing specific decoder settings.

Other features of the DVS 100 include picture controls for color, tint, contrast, brightness, horizontal shift and vertical shift; advanced menu controls; LCD panel control graphic; and an executive mode lock out.

Extron's new DVS 100 (PN: 60-304-01) lists for \$2,325 and will debut at ICIA's 1999 INFOCOMM International® in booth #2069. <http://www.extron.com/product/dvs100.stm>

Tweaker Use #50



Reggi Baika from Crimson Tech of Cambridge, MA has transformed an Extron tweeker into the body of a high-flying S³ machine. No doubt the Extron Flyer is still soaring through the wild blue yonder.

Send us your photograph of how you use the Tweeker. If we publish it in a future issue of ExtronNews, we'll give you a free VTG 150.

Send entries (along with your explanation) to: Extron Tweeker Contest
1230 S. Lewis Street
Anaheim, CA 92805



Taking the Strain Out

by **Mandi Speer,**
National Sales Manager

A cable with strain relief is better than a cable without strain relief, right? Not quite. Understanding what strain relief is, and what to look for, will help you evaluate the effectiveness of a cable's strain relief. All strain relief cables aren't created equal.

Although two strain reliefs may look the same, one may be effective while the second may provide little or no strain relief. Figures 1-3 each show a cable that is being pulled at a 90 degree angle to the BNC connector. The way the cable responds depends on whether proper strain relief is present, and on the quality of the strain relief.

Figure 1 shows a cable without a strain relief. Note how sharply the cable is bent. This is referred to as a small bend radius. The small radius is displayed on the graph within figure 1. The coaxial cable may be crushed, torn or completely severed at the point of the bend since it is being pressed against the sharp edge of the BNC connector. The dielectric will most likely be crushed by the bend, changing the distance between the cable's shield and the center conductor. This will change the impedance, resulting in signal reflection. The

result will be signal degradation or signal loss. Considering the number of cables in a typical AV system, the potential for such a problem is considerable. In a complex system locating a damaged cable could take substantial time.


Good strain relief increases the bend radius, preventing the cable from being damaged. *Figure 2* shows Extron's new BNC cable which features strain relief. Strain relief is accomplished by means of a boot. The boot is a semi-rigid protective covering at the BNC-cable connection. Note that the bend radius is now increased, even with tension on the cable. The cable no longer has the sharp bend. Notice how the sections/notches of the strain relief boot compress evenly, so there is no kink at any point. The result is a more gradual and consistent bend, which prevents damage to the cable. Good strain relief results when the boot is neither too rigid nor too flexible.

As was stated earlier, all strain reliefs are not created equal. Consider *Figure 3*. This cable appears to have a strain relief. However, when actually tested, the cable still bends too sharply. The



MANDI SPEER

boot is too rigid and does not bend, so the cable still kinks. All that has changed is that the point of the kink has been moved away from the connector. Other cables may have boots that are too flexible, allowing sharp bends within the boot section. Again, proper strain relief does not occur. The best way to test the quality of a cable's strain relief is to bend it at a 90 degree angle to the connector. Watch for binding between the sections and resulting sharp kinks. Cable with proper strain relief will always produce the result seen in *Figure 2*.

Extron's BNC-4 HR cable and BNC-5 HR cable feature strain relief. Feel free to test the quality of our strain relief. We are sure you will be pleased with the results. 

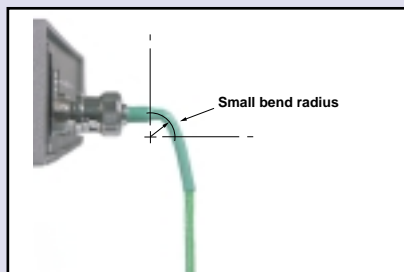


FIGURE 1.
A cable without a strain relief

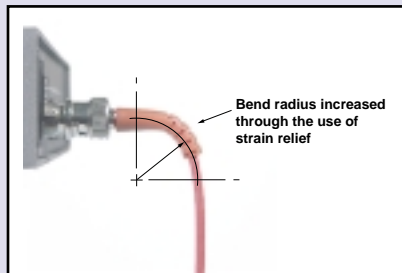


FIGURE 2.
A cable with Extron's strain relief

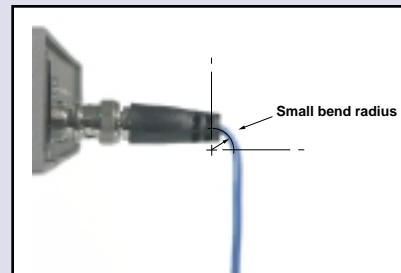


FIGURE 3.
A cable with an ineffective strain relief

Comb Filters: NTSC Decoding Basics

by Steve Somers, V.P. Engineering

Adaptive Comb Filter Decoders (Part 4)

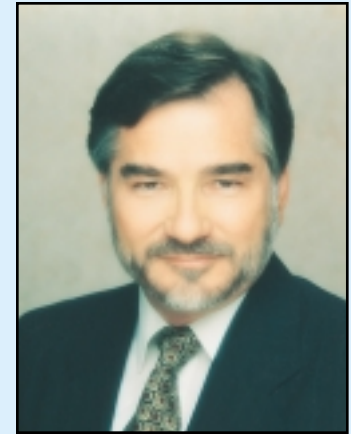
This is the last installment of our series on NTSC decoding basics, and Y/C separation in particular. Meanwhile the quest for high quality decoders continues on into the sunset of NTSC. The emphasis here is on the first step in the process known as Y/C (luma/chroma) separation since it does represent the most crucial step in realizing the full potential of the transmission medium. The earlier installments covered NTSC signal creation, notch/bandpass filtering, and line comb filters.

Implementation of high-speed digital processing and low cost memory components facilitated many improvements in Y/C separation. These strides in decoding performance involve decision-making, called adaption,

based upon image content. Moreover, having more image memory available means that video processing can now take place beyond the original 2D boundaries (i.e. the information within a picture field). Processing decisions now extend into the temporal realm, or from picture frame to picture frame. This means more intelligence in Y/C separation as subject matter moves across the screen from frame to frame.

2D OR NOT 2D?

Since conventional (line type) comb filters have problems handling diagonal lines and vertical color changes, it seems the first order of business would be to tackle these tricky situations. Remember that when processing diagonal lines, succeeding luma (Y) information is shifted in time and does



STEVE SOMERS

not properly cancel line-to-line or field-to-field. This results in Y information being interpreted as chroma (C) information. The outcome is "cross color" or the rainbow effect in the region of the diagonal lines. The vertical color changes, which do not match in time at the transition point, result in chroma information being interpreted as Y information. Hence, you see the "hanging dots" at the color boundary.

Now, suppose we take the two-line comb design discussed previously (see Figure 1). This design is comparing data between two stored lines and the incoming data. It utilizes averaging to soften the transition between colors. If we add a system called a correlator, data between the three lines can be tested before any actual averaging or summation takes place (see Figure 2). Here, if there is significant correlation of data value between Line 1 and Line 2, then CF= 0 and a difference between Line 2 and Line 1 is used. But, if Line 2 and Line 3 correlate to a higher degree, CF= 1 and the difference between Line 2 and Line 3 is used. If there is no correlation

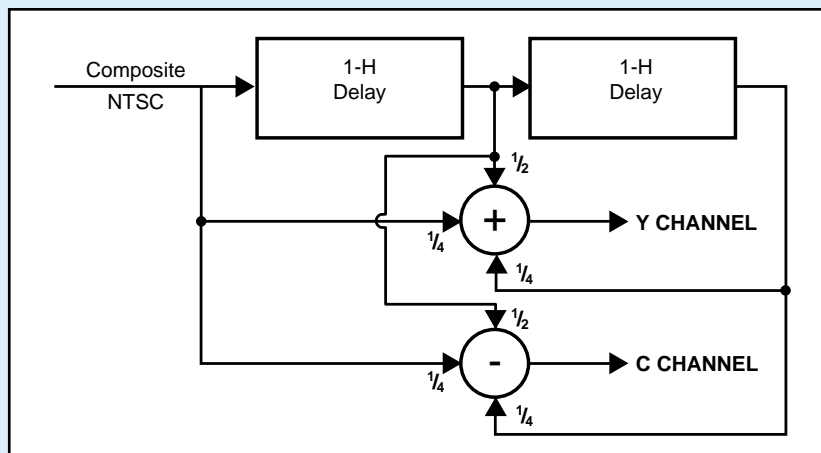
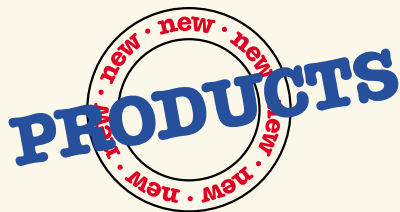


FIGURE 1. 2-LINE COMB FILTER

(continued on page 18—
See "Comb Filters")



Five New Interfaces with ADSP™ (Advanced Digital Sync Processing)

At Extron, we see universal interfaces as not only needing to work with all types of computers, but with all types of displays. As a result, ADSP™, Advanced Digital Sync Processing has been built into our new RGB 130xi, 134xi, 138xi, 150xi, and 158xi universal interfaces. Each of these has 300 MHz (-3dB) of video bandwidth, and is compatible with a wide variety of computer signals including SVGA, XGA, SXGA, XGA-2, Mac,

SUN, SGI, and more. All of these products include audio interfacing, with unbalanced, computer-generated audio being automatically converted to balanced line level audio. Other features include three-position level/peaking control, horizontal shift and automatic sync stripping on all color lines. Six BNC connectors provide simultaneous composite and separate sync, with sync on green also available.



RGB 130xi Interface

The RGB 130xi is a full-featured universal interface in a compact package. In addition to the other features mentioned, the RGB 130xi includes horizontal and vertical shift with dip switch selectable 75 ohm input

termination. The RGB 130xi also provides a monitor breakout cable power output jack for use with Extron buffered MBCs. The RGB 130xi (PN: 60-290-01) lists for \$720.

<http://www.extron.com/product/rgb130xi.stm>



RGB 134xi Interface

The RGB 134xi features all of the functionality and capabilities of the RGB 130xi, but also provides two sets of simultaneous use BNC outputs. With the RGB 134xi, two outputs are available without the need for a distribution amplifier. The RGB 134xi (PN: 60-291-01) lists for \$995.

<http://www.extron.com/product/RGB134xi.stm>

RGB 138xi Interface

The RGB 138xi takes the capabilities of the RGB 130xi and adds several key features. First, the interface includes two double-size architectural adapter plates for use with up to four sets of optional signal pass-through connectors. These plates are available with many of the pass-through connectors needed for most audio/visual systems.



Second, the RGB 138xi includes an unswitched AC outlet on its front panel (600 watts max). This outlet provides a

convenient method of powering a laptop or other device. The RGB 138xi (PN: 60-292-01) lists for \$860.

<http://www.extron.com/product/rgb138xi.stm>

RGB 150xi Interface



The RGB 150xi is similar to the RGB 130xi in that it includes peaking, audio interfacing and a signal detection standby/lock indicator. However, the RGB 150xi uses the 15-pin HD connector found on many VGA cables. This model also provides a buffered 15-pin HD local monitor output, allowing the attached computer to use

its monitor without needing a separate cable to split the signal before reaching the interface. The RGB 150xi also provides ID bit termination on pins 4 and 11 of its 15-pin HD input. This is necessary for use with computers that will not operate properly should a local monitor not be detected. The RGB 150xi (PN: 60-293-01) lists for \$795.

<http://www.extron.com/product/rgb150xi.stm>

RGB 158xi Interface

The RGB 158xi takes the features of the RGB 150xi and adds two double-size architectural adapter plates for use with up to four sets of optional signal pass-through connectors. These adapter plates are similar to those found on the RGB 138xi, and allow cables to be plugged into the front panel of the enclosure. In addition to the adapter



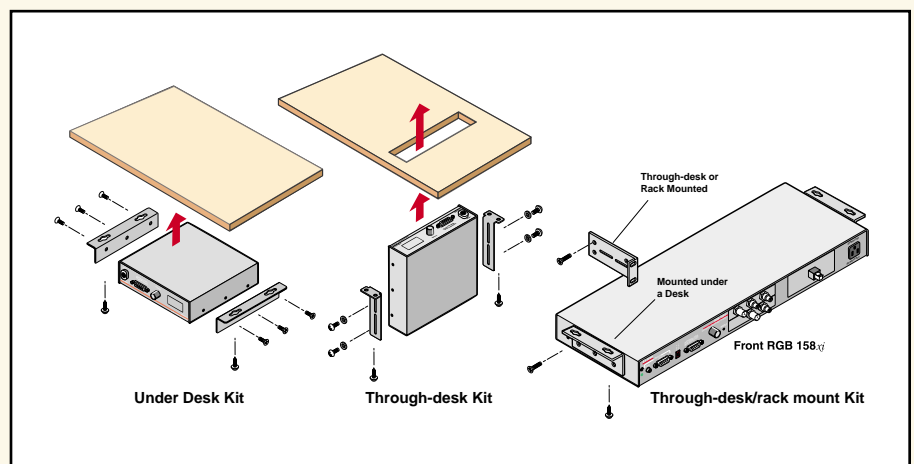
plates, the RGB 158xi includes an unswitched AC outlet on its front panel (600 watts max). A Macintosh adapter cable kit (PN: 70-078-01) is available for the RGB 150xi and 158xi, and lists

for \$125 without audio and \$140 with audio. The 13W3 adapter cable kit (PN: 70-079-01) lists for \$155 and \$170 with audio. The RGB 158xi (PN: 60-294-01) lists for \$895.

<http://www.extron.com/product/rgb150xi.stm>

Optional Mounting Kits

Optional mounting kits are available for all five interfaces, including an under-desk kit (PN: 70-077-01), a through-desk kit (PN: 70-077-02), and a through-desk/rack mount kit for the RGB 138xi, 158xi and MCP 1000 (PN: 70-077-03). These detachable mounting tabs affix to the sides of each interface and allow them to be mounted in racks, underneath or through any flat surface.





DDS 100 Digital Display Scaler

You need to display your high-resolution SUN workstation computer-video on your Plasma display—but your lower-resolution Plasma display won't lock to the high resolution signal. Solution: Use Extron's DDS 100, a digital display scaler that scales computer video signals up or down to match the native resolution of your Plasma display.

The DDS 100 is ideal for viewing images on display devices such as Plasma displays,

LCDs, and DLPs. The DDS 100 accepts any computer resolution up to 1600 x 1280, with horizontal scan rates up to 100 kHz and vertical rates up to 120 Hz. The DDS 100 features BNCs for RGB input and local monitor loop-out. The DDS 100 offers these computer-video scalable outputs: 640 x 480, 800 x 600, 832 x 624, 720p (HDTV), and 1024 x 768. For Plasma displays, the DDS 100 provides these Plasma rates: 848 x 480, 852 x 480, 1280 x 768, and 1360 x 765. RGsB, RGBS, or RGBHV

output is available simultaneously on five BNCs and a female VGA connector.

The DDS 100 features four levels of horizontal and ten levels of vertical filters to prevent detail loss and reduce flicker. The DDS 100 offers zoom control, centering/pan controls, and 130 memory locations—30 user-set and 100 factory presets.

The DDS 100 (PN: 60-305-01) lists for \$2995.00 (US Dollars).

<http://www.extron.com/product/dds100.stm>



MCP 1000 Control Panel

The Setting: University classroom with multiple computers, one large-screen projector, and an Extron switcher for routing computer, video, and audio signals. The Application: You need to install an easy-to-use remote control of the Extron switcher at the front podium, and your switching equipment is in the back of the room. The Solution: The MCP 1000, a programmable remote control panel that controls any Extron

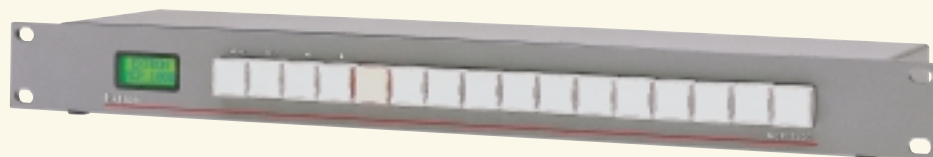
switching system with RS-232 or MKP 1000/Comm-Link remote ports. The MCP 1000 works with all Extron switchers and is compatible with multiple MCP 1000 and MKP 1000 (Matrix Keypad) units.

You can quickly and easily select switching options using the MCP 1000's one-button cross-point operation and one-button operation per

preset for global or room presets. The MCP 1000 operates in these modes: I/O switching for a particular output, global presets, room presets (Matrix 3200/6400 only), and custom configuration mode (RS-232 only). The rack, under-desk, and through-desk mounting brackets in combination with its compact, 1U enclosure with a 5" depth make the MCP 1000 convenient for space-restrictive installations. (See page 7, Optional Mounting Kits)

The MCP 1000 (PN: 60-298-01) lists for \$995.00 (US Dollars), and the MCP 1000 Slave (PN: 60-298-02) lists for \$815.00 (US Dollars).

<http://www.extron.com/product/mcp-mkp.stm>



6-Conductor High Resolution Cable

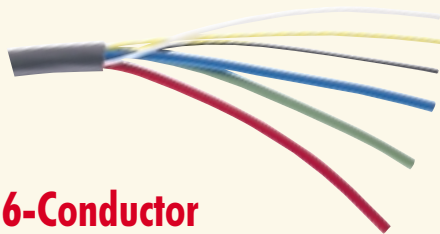
You need to run 300 feet of cable for distribution of 1280 x 1024 computer-video signals, but the

Super High Resolution cable doesn't fit into your budget and the Mini High Resolution cable doesn't deliver the performance you need. What to do? Consider Extron's Six Conductor High Resolution Cable, which fills the niche between the Mini High Res and SHR cables. The High Res cable's attenuation of -3dB/100 feet @ 100 MHz allows it to maintain system bandwidth of the original signal. With a built-in ripcord and sequential numbering, the High Res cable offers high performance, flexibility, and value.

The High Resolution cable is comprised of six coax conductors, each wrapped in SuperFlex jacket material. Three 20-gauge coaxial conductors carry the R, G, and B, while three 26-gauge coaxial conductors carry the horizontal sync, the vertical sync, and an additional signal, such as composite video.

Available in bulk rolls of 500 feet (153 meters) the High Resolution cable (PN: 22-124-02) lists for \$1750.00 (US Dollars).

<http://www.extron.com/product/hiresc.stm>



TECH

c o r n e r

Image Scaling Technology

by Roger McCarten,
Product Manager

Recent advances in video processing technology have brought the price of image scalers down to the point where they can be considered in even low to mid price AV systems. As scalers have become more prevalent in AV systems, questions and misconceptions have arisen regarding scaler operation. Therefore, this column will be devoted to providing a basic and accurate understanding of scaler operation and applications.

SCALER TECHNOLOGY

Scalers operate similar to a line doubler or line quadrupler. Like a line doubler/quadrupler, a scaler takes an interlaced video signal (NTSC, PAL and SECAM) and outputs a progressive scanned signal and varies the number of scan lines to change resolution. The signal processing technique is essentially the same. In fact, a line doubler/quadrupler can be thought of as a fixed resolution scaler. A scaler does not process pixels and then transmit an image in pixel form. The output of a scaler is a video signal.

Most upscalers will accept a composite or S-video signal and convert it to any of a number of output resolutions. However, scalars are not limited to accepting composite or S-video, and then converting them to computer signals. Some scalars will accept computer signals, and down-convert them to composite, S-video, or even up-scale and down-scale them to other computer resolutions, like Extron's VSC 300. Other scalars will accept computer signals and either up-scale or down-scale them as needed, like Extron's DDS 100.

SCALER FEATURES


The main advantage of a scaler is that it can change its output rate to match the abilities of a display device. This is especially advantageous in the case of digital display devices. Digital display devices produce images on a

fixed matrix. In order for the digital display device to provide optimal light output, the entire matrix should be used (Figure 1). To do this, the digital display device uses its internal pixel map processor to do scaling. An external scaler is designed to do the same thing, but generally provides better decoding, more user control, and will store picture settings information. This increases flexibility, making changing sources and changing image attributes easier.

Since a scaler can scale the output both horizontally and vertically, this allows it to change aspect ratios. So a scaler can take a standard NTSC video signal and convert it to a 16 x 9 HDTV output. If a system has a HDTV type of display, but sources include NTSC, PAL or SECAM, this feature can be particularly useful. Extron's new scaler, the DVS 100 offers HDTV output. HDTV output resolutions include 480p, 720p, and 1080p. (Both of Extron's new scalars, the DDS 100 and the DVS 100, have been preprogrammed for the most common LCD, DLP and plasma displays. They will output an image that will fit the display area exactly).

Another advantage a scaler can offer is the ability to adjust horizontal and vertical size and positioning, for a variety of video inputs. Many digital display devices don't have the memory to adjust for multiple input signals. This makes it necessary to make adjustments for each new signal. Extron's DDS 100 has the capability to store settings for up to 30 sources. Each source can be set up in terms of horizontal and vertical sizing, and position. The horizontal and vertical filtering settings will also be automatically saved for each source. Once each source is set up, the DDS 100 will recall the settings for the appropriate source signal when its reconnected.

THE DVS 100 AND THE DDS 100

Extron will be introducing two scalars at Infocomm, the DVS 100 and the DDS 100 (see articles on page 1 and page 8). These scalars will allow you to considerably simplify your AV system. NTSC, PAL, SECAM and computer sources can be converted into any of the major computer or HDTV, LCD, DLP or Plasma resolutions, to match other signals in the system. This will make signal routing and display device selection much easier. 



DDS 100—Digital Scaler

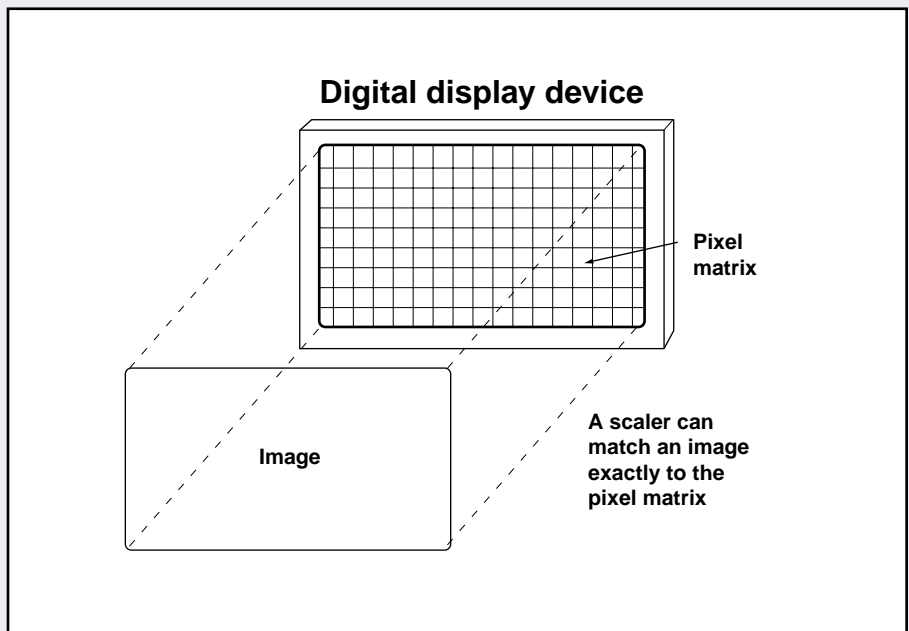


FIGURE 1. Converting image's resolution to match display device's native resolution

Unique Techniques: Extron Goes Hollywood

Planet Hollywood to be exact. This issue's look into an installation covers the design and later upgrade of one of the chain's newest sites: Cape Town, South Africa. The system was designed by Pro Systems of Pretoria, South Africa and Pro Sound Ltd. of Johannesburg, South Africa, and includes several Extron products. The initial installation was seen in the October 1998 issue of *Sound & Communication*.

The goal of most Planet Hollywood (PH) installs is to distribute a common video and audio signal throughout the restaurant, usually comprised of movie clips featuring the founding celebrities: Arnold Swartzenegger, Sylvester Stallone, Bruce Willis, etc. How Pro Systems and Pro Sound designed the system was left to their discretion, but the price had to be reasonable and the quality had to be mind-blowing. PH was very particular about this, and before getting started, Pro Sound was required to visit other sites to see just what PH wanted. Sub par sound or video quality was not acceptable. This focus on quality is due to the fact that audio and video are considered integral to the PH experience. It was up to Pro Systems and Pro Sound to make it work, and do so without any structural changes to the site—a 19th century waterfront warehouse.

Display devices at PH include two Sony VPH-1001 QM projectors using 120 inch Stewart rear projection screens, eight Mitsubishi VS-6043 rear projection televisions, and two Sony KV-F 29 inch televisions. System inputs include a Sony SVO-2100 S-VHS player, a Kalatel KTA-6C2C color Cyberdome camera, a Marantz CC38 CD player, a Pioneer 50



John Buckley (right) and Jimmy Diti of Pro Systems in front of Planet Hollywood, Cape Town. These two have worked together in the A/V industry since 1974, and use Extron products in many of their designs and installations.

laser disc "jukebox," a PAL to NTSC converter for use with non-dedicated sources, and an Extron Emotia 800 Jr. scan converter. The latter was used to display computer generated graphics over the displays during source changes. To switch and keep everything under control, an Extron MAV 62 audio video matrix switcher was chosen. This is a six-input, two-output composite video switcher with balanced audio. Having fewer outputs than display devices was not considered a problem, as all of the devices were to use the same signals. Distribution amplifiers were used to split the MAV 62's outputs to all of the displays.

Audio signals were also routed through the MAV 62, which were then fed into a DBX 166 stereo compressor/limiter, and then to a Rane RPE 228 equalizer. From the Rane EQ the signals were split by a pair of 1x3 VCA controllers, fed to six

Rane ME 15B micrographic EQs, and finally to Crown 460 and 1400 amplifiers. The speakers were all made by Electro-Voice and included 76 S-40 2-ways, and 26 DL12W sub-bass loudspeakers.

Once completed, PH expressed their profound satisfaction to Pro Systems and Pro Sound. The company representative responsible for declaring the system "up to spec" claimed that it was one of the best he'd personally seen in a Planet Hollywood. "We have received many compliments from people who say [the system] is better than any other Planet Hollywood's, save some very high budget restaurants in places like Orlando, Florida, and Los Angeles," adds John Buckley of Pro Systems. This is great praise, especially when considering that the poor exchange rate between the U.S. Dollar and the South African Rand almost meant the show wouldn't go on. Ultimately it

did, and at under half the cost of the system originally recommended by Planet Hollywood USA's A/V consultant.

While everyone was happy with the install, Pro Systems and Pro Sounds were contracted to return for some necessary upgrades following the tragic bombing of PH Cape Town last August. While most of the video equipment survived the explosion, several changes were made. First, the MAV 62 and its distribution amplifiers were exchanged for an Extron Matrix 50 12x8 composite video and stereo audio switcher. This was necessary so that some of the displays could be used for sports and other television programming and the remainder would use the company S-VHS tapes. "South Africa is a sports mad country, and people love to watch on the big screens," says Buckley. At the same time PH decided to stop using laser disc programming entirely in favor of S-VHS tapes, so a second Sony SVO S-VHS player was added. Lastly, four of the Mitsubishi VS-6043s damaged in the bombing were replaced with Sony KP-EF61s when replacement Mitsubishi's were not readily available.

Understandably, security became a major concern following the bombing. Two




Vidamax CD-530 color surveillance cameras were attached to secondary inputs on the two Sony KV-F 29 inch televisions. This allows patrons to see themselves as they enter the restaurant and pass through newly installed metal detectors. The images are then recorded on time-lapse VHS recorders. "Planet Hollywood Cape Town has gone to great expense with security personnel and measures to prevent the re-occur-



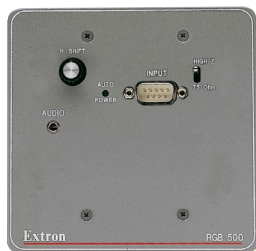
An Extron Matrix 50 (center) provides centralized control over Planet Hollywood's various video and audio sources.

rence of such a terrible event," says Buckley.

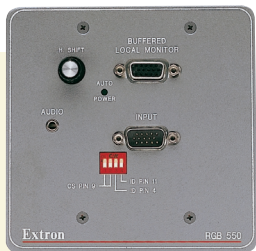
While there are currently no further plans to expand PH Cape Town, Pro Systems is keeping busy, using Extron products in many of their installs. "We like the wide bandwidth, low noise, reliability and user-friendliness of Extron Products," explains Buckley. "The service we get from Extron Europe is also excellent." 

Would you like to see your installation covered here? Do you have a unique method of using Extron products? Tell us about it! Call Carol Hubben at 714.491.1500 and your unique technique may be in the next issue of ExtronNews.

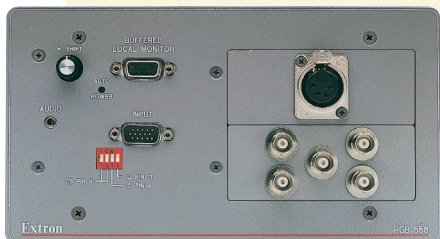
RGB 500 Series— continued from page 1



RGB 500 Interface



RGB 550 Interface



RGB 558 Interface

lenges when installing architectural interfaces—fear not. The RGB 500 Series is the solution.

These streamlined computer-video interfaces offer models with either 15-pin HD or 9-pin input connectors, variable connection plates, dual interface models and special mounting capabilities for European installations—all behind a clean, subtly designed faceplate. But don't judge them solely on their slick features and good looks. The RGB 500 Series interfaces offer high performance and complete compatibility with digital displays, such as LCD, DLP and Plasma, thanks to the addition of Extron's own Advanced Digital Signal Processing (ADSPTM).

The 500 Series is comprised of the RGB 500, RGB 550, RGB 508 and RGB 558. This series reflects Extron's earlier "in-the-wall" interface designs, but these new

interfaces are more adaptable to existing spaces and connection requirements. Because architecture and design play increasingly important roles in technological considerations, the RGB 500 Series offers a clean, streamlined approach to computer-video interfacing that meets the demands of boardrooms, auditoriums and classrooms alike. Sleek, subtle and extremely flexible, this new interface series has more than good looks up its sleeve.

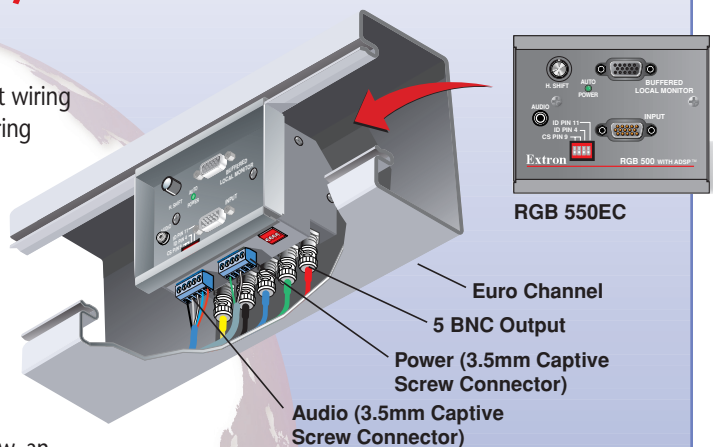
Each interface is only two inches thick and can be mounted directly to the drywall—no need to rely on finding a wall stud for junction box installment. With the 500 Series you simply cut a hole in the desired location, mount a "mud-ring" bracket to the drywall pull the necessary cables leaving a short service loop, connect the cables to the interface (all interface signal connections are on the bottom of the interface) and attach the interface to the bracket. A sleek faceplate, with input connectors, covers the interface for a neat and tidy final presentation. The smaller design and mounting flexibility of these interfaces are invaluable for

(continued on next page)

Per gli Europei (For the Europeans): RGB 500 Series Euro Channel

The building construction methods used in Europe are such that wiring inside of an exterior wall is not possible. Therefore, electrical wiring and cabling are accomplished via channels that run along the outside of a wall, along baseboards or just below windows. These channels route the wires, cable and connections necessary for electricity, lights, computer networks, A/V components, etc.

Extron has taken the nature of these channels into consideration. Along with its new RGB 500 Architectural Series of interfaces are special interfaces with connecting faceplates that fit right into the 12 and 17 centimeter space of these channels. Now, an installer can use an RGB 500, 508, 550 or 558 to interface video, audio, network connection, computers, etc.

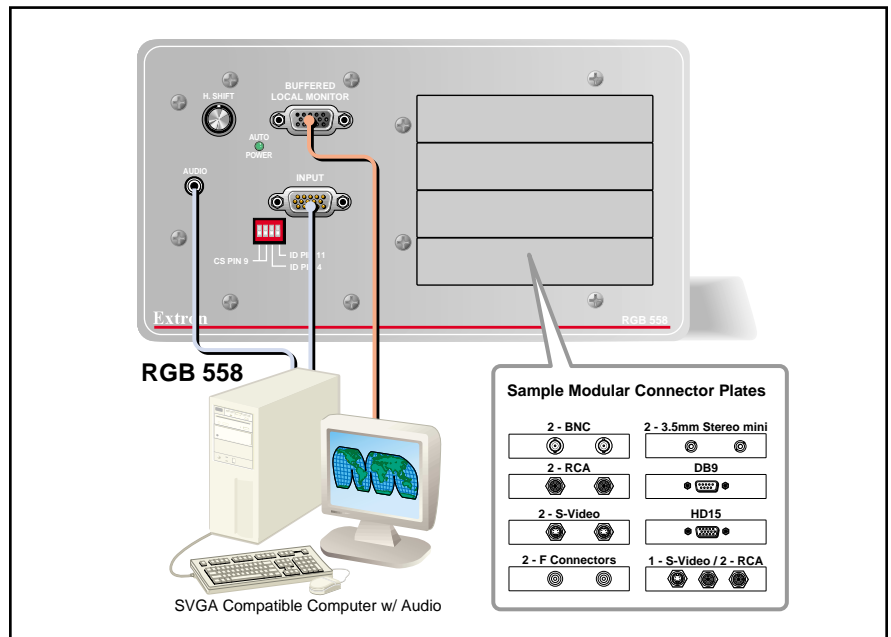


RGB 500 Series— continued from previous page

many situations where space is a precious commodity.

Now, let's talk performance. All four of the interfaces provide 300 MHz (-3dB) video bandwidth, auto power, 75 ohm termination, horizontal shift control, active PC audio interfacing to convert unbalanced audio into balanced audio and three levels of gain and peaking. Each interface also provides Extron's exclusive Advanced Digital Sync Processing (ADSP™) for universal digital device compatibility as well as Digital Display Sync Processing (DDSP™) for use with devices requiring unmodified sync signals.

The RGB 500 and RGB 550 provide single-width faceplates (about 4" x 4") with
(continued on page 16)



RGB 558 Application Diagram

"We Like It!"

HB Communications Take on Extron's New BNC-5 SuperFlex Plenum Cable by Kevin Collins, HB Communications

HB Communications uses Extron's BNC-5 SuperFlex HR Plenum Cable for all types of installations, such as staging, rental, trade shows, and meetings. Our standard installation is a 5-wire projector system—5-wire to work with all kinds of equipment and to deal with sync differences.

Our technical and engineering staff noticed several helpful features of the Extron's new BNC-5 plenum cable.

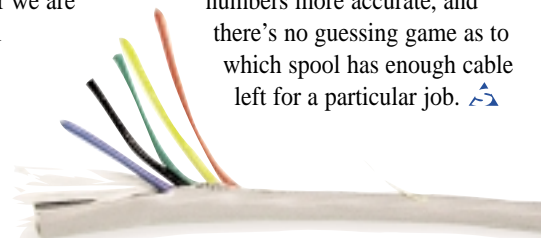
The flexibility of the SuperFlex jacket is a plus when maneuvering the cable through tight corners. During our initial tests we worked the cable to see if it would bend several times without splitting the jacket—this is a key feature of the plenum cable—and we put lots of pressure on the cable during long cable runs. Well, the BNC-5 cable passed both tests—it didn't sacrifice durability for flexibility.

We use the plenum-rated cable for installs that require CL2P (National Electric Code) cable. One thing about the BNC-5 plenum cable that our installers are impressed with is how UNLIKE the usual plenum cable Extron's BNC-5 plenum cable is so much more flexible and easier to work with than typical plenum cable.

When the installers are stripping the cable for termination, the ripcord helps them open up only the outside jacket, so they don't accidentally nick any of the inner cables. This is a big help when we are using sub-contractors to install the base building AV wiring or we are asked to use the "in-house" electrical contractor.

Another useful feature is the sequential numbering. The numbers are printed a foot apart on the cable jacket, so we can

calculate the cable length without measuring it. By looking at the ends of the cable, we always know how much is left on a spool. Plus, when we put in a bid, what we do is look at the blueprints and estimate how much cable to use for the cable path. Sometimes we end up using a great deal more cable, because of obstructions or variances with the conduit plan. With sequential numbering, it's easy to see how much more cable than anticipated we've actually used in a given pull. That also helps make our cable inventory numbers more accurate, and there's no guessing game as to which spool has enough cable left for a particular job. 🏠



NEW news from the INDUSTRY

ExtronNews publishes information about new products that are relative to the Extron product line in the New News section. If you would like a new product to be reviewed for New News, please send a press release, literature, contact name and a four color slide or photo to:

Pat Charlton, New News
Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
Phone: (714) 491-1500 ext. 6244

DIGITAL PROJECTION

Digital Projection has recently introduced the **POWER 5gvC**, a 3-chip Digital Micromirror Device (DMD) projector. The **POWER 5gvC** has a horizontal scan range of 15–64 kHz, a vertical scan range of 24–100 Hz and a native resolution of 1024 x 768. It offers 4500 ANSI lumens brightness output and advanced video decoding by Faroudja Laboratories. The projector offers three independently configurable inputs on 5 BNC connectors, which are selectable via remote control. The projector will accept RGB, component video, S-video, and composite video. The suggested list price is \$64,995.

Recommended Extron accessories:

For computer connection use RGB 202xi, RGB 302/304 or Architectural Series interfaces. For RGB distribution use ADA distribution amplifiers, BNC extension cables. Use Lanciavi line doubler or Sentosavi line quadrupler to enhance video signals.



POWER 5gvC

MITSUBISHI

Mitsubishi has recently announced the **Diamond Pro 2020u**, a 22" flat-faced desktop monitor. The new Diamond Pro 2020u is compatible with IBM, Apple Macintosh, Power Macintosh, Windows 95 and high-resolution third-party graphics standards. It offers a 30–121 kHz horizontal scanning range, a 50–160 Hz vertical scanning range and a maximum non-interlaced addressable resolution of 1800 x 1440. The monitor has an attached 15-pin HD (VGA) input cable. The "u" following the monitor name is significant, indicating that this monitor features a USB hub. Mitsubishi has equipped the self-powered USB hub with an exclusive arrangement of two upstream and three downstream ports so two independent computers may share a single set of USB devices. The suggested list price is \$1,499.

Recommended Extron accessories:

For VGA, use the P/2 DA2 Plus, VGA Switchers and VGA Plenum cables. For Mac, use the Mac DA2 Plus and our Mac/VGA adapters. For RGBHV systems, use the RGB 130xi and 15HDM-RGBHVF adapter. To get video into the VGA switcher, use the VLD 50.



2020U

PROXIMA

Proxima has recently introduced the **Pro AV 9400** LCD multimedia projector. The Pro AV 9400 is the first projector to utilize the PanelLink industry standard. PanelLink technology makes possible the low-cost, high-quality, standardized, all-digital end-to-end link between computers or other digital electronics devices, and digital displays. The Pro AV 9400 has a horizontal scan range of 15–80 kHz, a vertical scan range of 50–100 Hz, a native resolution of 1280 x 1024 and 2300 ANSI lumens brightness output. The projectors offers two computer input channels: RGB (15-pin HD)/DFP (Digital PanelLink Interface) and RGBHV/BNC. It also offers two video input channels which include 3 BNC for component and composite video and one mini DIN 4-pin for S-video. The suggested list price is \$23,999.

Recommended Extron accessories:

For VGA, use the P/2 DA2 Plus, VGA Switchers and VGA Plenum cables. For Mac, use the MacDA2 Plus and our Mac/VGA adapters. For RGBHV systems, use the RGB 130xi and 15HDM-RGBHVF adapter. To get video into the VGA switcher, use the VLD 50. For complete system control, use the System 5cr.



PRO AV 9400

RFI RADIO SALLY SYSTEMS, INC.

RSI unveils the **MediaPro 384** Videoconferencing Series for use with Laptop computers. The Mediapro 384 codec is H.320 standards-based and internalizes all videoconferencing hardware electronics, inverse multiplexer (IMUX) and network terminal adapters (NTI). It attaches via the SCSI port to laptops or PCs and allows videoconferencing over ISDN lines at 384 kbs. The laptop or PC's output can then be connected to display devices such as projectors or monitors. The MediaPro 384 starts at \$4,995.00.

Recommended Extron accessories:

For RGB distribution, use the P/2 DA2 Plus, VGA Switchers and VGA Plenum cables or ADA distribution amplifiers and BNC extension cables. For integration with large screen displays, use the RGB 130xi. For integrating external video sources to the codec, use the MAV 62 video and audio matrix and YCS SW6 MX.



MEDIAPRO384

SIM2 MULTIMEDIA

SIM2 Multimedia has recently introduced the **SMP420ID** 42" plasma display. The SMP420ID offers a native 16:9 resolution (852 x 480 pixels). Typical use will be to process and display information, also over the network, thanks to the integrated computer. It sports a 2 GB hard disk, floppy disk drive, CD-ROM, integrated stereo audio (2 built-in 5W speakers), Ethernet network connection capability, keyboard and mouse connection and more. Touchscreen capability and software personalization come as options. It offers a CVBS and S-VHS video input on RCA connectors for PAL, SECAM and NTSC and an analog VGA video output on a 15-pin HD connector. The suggested list price is \$16,000 USD.

Recommended Extron accessories:

For VGA, use the P/2 DA2 Plus, VGA Switchers and VGA Plenum cables. For Mac, use the Mac DA 2 Plus and our Mac/VGA adapters. For RGBHV systems, use the RGB 130xi and 15HDM-RGBHVF adapter. To get video into the VGA switcher, use the VLD 50.



SMP420ID

SONY

Sony has recently introduced the **VPL-X1000U** LCD projector. The VPL-X1000U offers a horizontal scan range of 15–91 kHz, a vertical scan range of 43–85 Hz and a native resolution of 1024 x 768. It provides 1100 ANSI lumens brightness output and can handle VGA, SVGA, XGA and SVGA (compressed), as well as composite video, Y/C video and component video signals. The projector inputs are: RGB/Component (15-pin HD x2), composite video (RCA) and S-video (4-pin DIN). The suggested list price is \$8,990 with a 1.3x lens. A variety of optional lenses are available for use with the VPL-X1000U.

Recommended Extron accessories:

For VGA, use the P/2 DA2 Plus, VGA Switchers and VGA Plenum cables. For Mac, use the Mac DA 2 Plus and our Mac/VGA adapters. For RGBHV systems, use the RGB 130xi and 15HDM-RGBHVF adapter. To get video into the VGA switcher, use the VLD 50.



VPL-X1000U


RGB 500 Series— continued from page 13

computer-video and audio input connectors. The RGB 500 uses a 9-pin universal connector with which the appropriate monitor/laptop breakout cable must also be ordered, and the RGB 550 uses the popular 15-pin HD connector. The RGB 550 also offers a buffered local monitor output connector so video images can be viewed on the main display and monitor simultaneously. It provides ID bit termination for pins 4 and 11 from the front panel and can be used to interface Apple/Mac and 13W3 style workstations (SUN, SGI, and IBM PowerPC) with available adapter cables.

The dual faceplate design and removable/adaptable plates of the RGB 508 and RGB 558 provide extended connection flexibility and versatility. For example, you can configure the interface with pass-through connections for S-video and left/right audio. Or, configure the interface to accommodate computer-video and network connections as well as RGBHV.

Two other major advantages of the 500 Series are dual interface design and compatibility with European channel mounting systems. Designed on 4-gang size face-

plates, these dual interfaces can be found in the RGB 500 and 550 models. This dual interface design is particularly convenient when you need more than one interface in a single location.

Faceplates in Extron grey, white and black are available for all models. The plates mount with small screws that are indistinguishable when secured for a more aesthetically pleasing appearance. See how well these 2" interfaces will fit into your next installation. The RGB 500 Series interfaces debut at INFOCOMM '99, booth #2069. 

<http://www.extron.com/product/rgb500.stm> • <http://www.extron.com/product/rgb508.stm> • <http://www.extron.com/product/rgb550.stm> • <http://www.extron.com/product/rgb558.stm>

New Catalog, ExtronCD, and Handbook Now Available

Extron has released its 1999-2000 Product Catalog and ExtronCD in both USA/domestic and international versions. The Catalog features all of Extron's new products and current product lines. There are also cross-reference lists for monitors, computers, and projectors. The ExtronCD includes the Catalog as well as brochures, product images, application diagrams, and user's manuals.

Also released, Extron's Handbook VI of Computer Interfacing and Video Distribution on CD is loaded with new training materials, updated articles from Handbook Volumes I-V, over 100 pages of expanded cross-reference lists, and a glossary of industry terms. New articles discuss topics such as digital video, video equalizing, and matrix switching. This Handbook CD is an excellent resource for veteran and new A/V professionals alike.

The 1999-2000 Extron Product Catalog and ExtronCD are available free of charge. The Handbook Vol. VI (Domestic PN: 67-051-01 and International PN: 67-051-02) lists for \$60.00 (US Dollars).

Extron's New Sync Stabilizer



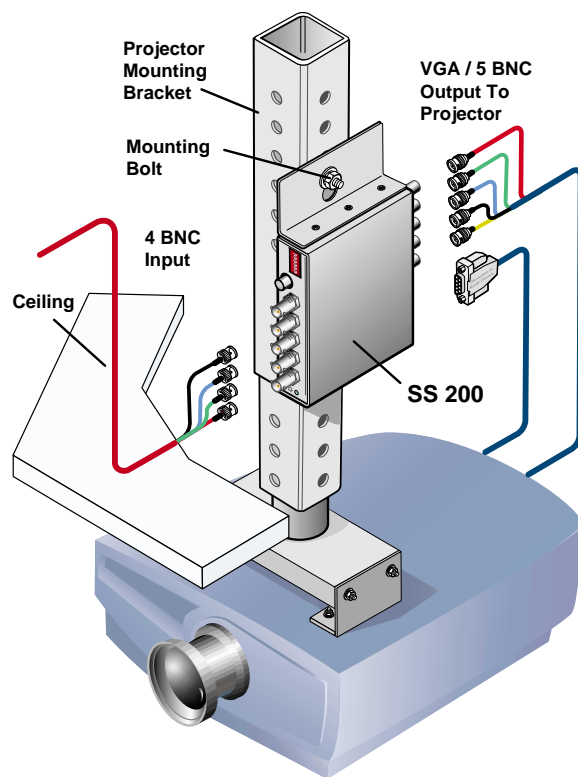
SS 200 with ADSP™

Extron's **SS 200** Sync Stabilizer with Advanced Digital Sync Processing (ADSP™) compensates for the sync processing limitations of digital display devices. LCDs, DLPs, and Plasma Displays often have trouble with sync signals that have been altered through previous processing or interfacing.

Through Extron's exclusive ADSP™ technology, the SS 200 cleans up sync so that clear, stable images are produced, and re-establishes the proper timing relationship between the video and sync signals. Common image problems—such as hooking, tearing, or bending at the top of the screen are eliminated.

The SS 200 provides these advantages:

- Bandwidth: 300 MHz (-3dB)
- Compatible with any analog RGB signal with horizontal frequency between 15-145 kHz and vertical frequency between 30-170 Hz
- RsGsBs, RGsB, RGBS, or RGBHV input on five BNCs
- Digitally restored RGBHV or RGBS output simultaneously on five BNCs and 15-pin HD female connector
- Horizontal shift control
- 75 or 510 ohm sync termination, switch-selectable
- Detachable bracket for mounting near projector included
- Provides power jack for 12VDC (detachable 120-240VAC desktop power supply included)



The SS 200 lists for \$695.00. For complete details, visit our website at <http://www.extron.com/product/ss200.stm>

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Comb Filters— Continued from page 5

at all, then $CF=0$ and the difference between Line 2 and Line 1 is used. This type of adaptive system works only within a picture field and is called intrafield filtering. Additional logic is usually added to detect whether the system sampling of data is stable enough to perform proper combing. If not, the system switches back to the notch/bandpass filtering method. This is quite common when decoding video from the typical VHS VCR.

The term “2D” indicates that the filter implements detection of both horizontal transitions (along horizontal lines) and vertical transitions (between horizontal lines) within the picture field of interest. The term adaptive carries wide meaning in that comb filter manufacturers create unique methods that enable the filter to make better decisions as to which process algorithms to use. Adaptive processing can lead to increased noise or graininess in the image. To combat this, a system function may be added called coring. The coring function modifies (or outputs the equivalent of zeroes) the data values near a transition so as to remove the random artifacts. This, in conjunction with a contouring circuit, adjusts the values to provide a much more pleasing image transition.

So, the 2D adaptive filter attempts to eliminate the hanging dots at color transitions. If a situation occurs where there are different colors on three successive lines, the filter fails and artifacts appear. The problem will be most noticeable on specific, abrupt color changes and not so obvious on gradual color transitions. On diagonal lines, the 2D adaptive filter is less effective. There is typically not much luma correlation from one line to

another. Although some averaging occurs, this filter type is only marginally better than a regular line comb.

CURE FOR MOTION SICKNESS?

3D motion adaptive comb filters represent the most sophisticated comb technology available. While still pricey compared to previously discussed filter types, they can provide near perfect separation of Y and C for still frame images. In 3D comb filtering, picture information is taken and compared to information in successive frames (called inter-frame filtering), as opposed to 2D filters which process data taken from successive lines within a field or frame (intra-frame filtering).


For still images, the picture data from one frame to the next is essentially identical. Since it has a high degree of correlation, making comparisons (similar in topology to the line comb examples) provides near perfect output of correlated Y and C. In this case, diagonal lines and color transitions can be matched very well. This is the key advantage over the 2D filter.

However, if there is picture movement or color changes between frames, the 3D system will produce noticeable errors. Here is where the motion adaptation comes into play. The 3D filter compares the data of several video frames to

determine correlation (still image) or lack of it (motion present). If motion or serious color changes are detected, the system switches to 2D adaptive filter operation. Under this condition the 3D filter may perform no better than the 2D filter. Different implementations of the filter will use different algorithms for the determination of motion or color changes. This motion detection is not a trivial pursuit and will separate the good 3D comb filter from the not-so-good one.

YOU TOO CAN BECOME AN EXPERT

After all the foregoing, what does it mean to you? How can you tell one filter from another? That is probably the most important question on your mind.

Further, it's one thing to recognize the type of comb filter design and quite another to determine if it's performing correctly. Let's see if I can provide you with “something to walk away with”. Refer to the table on the opposite page for a compilation of features and problems with each of the topologies discussed in this series on Y/C separation in the NTSC decoding process. While you may not find that memorizing the various features is any advantage to you, pay particular attention to those features that help identify the comb filter type of most interest to you. You never know when and where you'll see a good comb filter. 

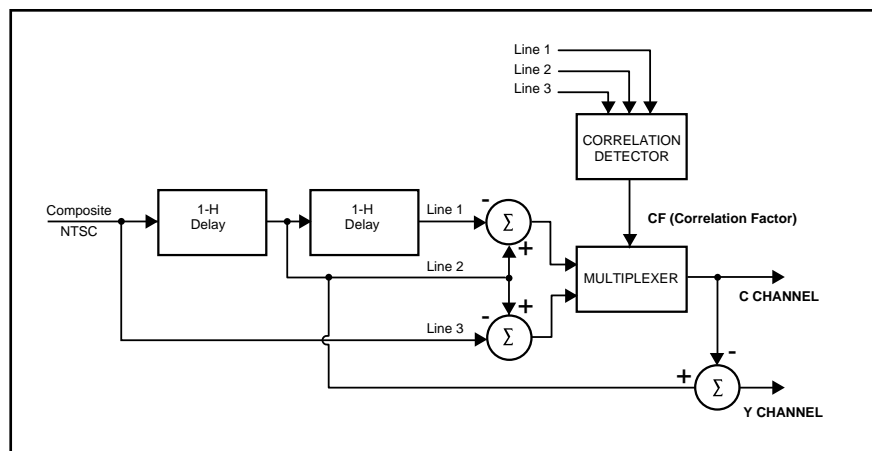


FIGURE 2.
2D Adaptive comb filter

BASIC Y/C FILTERING CHARACTERISTICS

Y/C Filter Types	Characteristics	How to Identify?	Which Test Signals?
Notch/ Bandpass	<ul style="list-style-type: none"> • Low luma bandwidth • High amounts of cross-color and cross-luma 	<ul style="list-style-type: none"> • Soft edge definition • Gross amounts of dot crawl around text and at vertical color boundaries • Regions with closely spaced lines go grey 	<p>Multi-burst: look for grey band at 3.58 MHz band region</p> <p>Color Bars: heavy dot crawl on vertical transitions; poor green/magenta transition</p> <p>Resolution Wedge: cross-color in wedge along with rapid loss of resolution near the wedge end</p>
Simple Line Comb	<ul style="list-style-type: none"> • Increased horizontal resolution • Hanging dots at color boundaries • Vertical dot crawl • Severe artifacts at vertical color transitions 	<ul style="list-style-type: none"> • Can better see closely spaced lines, although lots of cross-color • False colors at vertical color transitions • Better BW than notch 	<p>Multi-burst: improved horizontal resolution; clarity of all bursts</p> <p>Color Bars: dot crawl on vertical edges; abrupt color errors between upper & lower bar colors</p> <p>Resolution Wedge: some resolution improvement, but lots of cross-color</p>
2-Line & 3-Line Type	<ul style="list-style-type: none"> • Increased horizontal resolution, but less vertical resolution • Better color transitions • Hanging dots • Dot crawl 	<ul style="list-style-type: none"> • Can better see closely spaced lines, although some cross-color • Improved color transitions • Better BW than notch • Lower vertical resolution • Hanging dots on vertical color transition 	<p>Multi-burst: good horizontal resolution; clarity of all bursts</p> <p>Color Bars: improved vertical color transitions; hanging dots along the vertical color transitions</p> <p>Resolution Wedge: lower vertical resolution; still visible cross-color</p>
2D Adaptive	<ul style="list-style-type: none"> • Nearly no hanging dots • Good horizontal bandwidth • Improved cross-color performance 	<ul style="list-style-type: none"> • Fails to eliminate dots in regions of high detail • Nearly no dots at base of text or other color transitions 	<p>Multi-burst: good horizontal resolution and clarity of all bursts</p> <p>Color Bars: near elimination of hanging dots; cleaner color transitions; some vertical dot crawl</p> <p>Resolution Wedge: some cross-color and loss of vertical resolution; good horizontal resolution and correlation</p>
3D Adaptive	<ul style="list-style-type: none"> • Near perfect on still images • Switches to 2D during motion • Improved vertical resolution 	<ul style="list-style-type: none"> • Best H&V BW with no dot crawl or hanging dots • Possible artifacts around moving objects 	<p>Multi-burst: good horizontal resolution and clarity of all bursts</p> <p>Color Bars: virtually no dots vertical or horizontal; smooth color transitions; good green/magenta transition</p> <p>Resolution Wedge: when stationary, full resolution w/o cross-color artifacts; when moving, same as 2D</p>



Think you've seen everything at the Projection Shoot-Out?

Think again. Steve Somers, Extron Electronics' Vice President of Engineering and Chairman for the International Communications Industries Association's (ICIA) INFOCOMM International Projection Shoot-Out® talks about what's new for '99.

"This year Shoot-Out attendees can expect to see a new HDTV demo category; learn pointers from a multi-lingual tutorial CD; encounter specially controlled lighting; and listen to background narration provided by none other than, AOL's Elwood Edwards" explains Somers.

Here's a quick run down on '99: New HDTV category highlights new twenty-seven feet wide by fifteen feet high (16:9 aspect ratio) screens from Stewart Filmscreen. Imagery consists

of moving images from movie and video created especially for HD.

Used to all the darkness that shrouds the Shoot-Out? The large venue projection categories, including the HDTV demo category, will have lighting throughout the hall varied from zero to as much as forty-percent allowing viewers to observe how bright each projector's light output is and how well they handle ambient light.

The format for the '99 tutorial is depicted in a sort of story line and will support five different languages including English, Spanish, German, Japanese and Mandarin Chinese.

Elwood Edwards, the "voice of AOL" will be in the background audio describing some of the salient concepts and features of the test patterns and images seen during the show.

INFOCOMM '99 will be held at the Orange County Convention Center in Orlando, Florida. Show dates are as follow: Thursday, June 10 from 10:00am to 6:00pm; Friday, June 11 from 9:00am to 6:00pm; and Saturday, June 12 from 9:00am to 4:00pm. The Shoot-Out will be open during show hours to INFOCOMM attendees.

The 1999 Shoot-Out CD and Tutorial CD will be available for purchase at the show and through Extron Electronics. Prices and part numbers for the CDs are as follows: Shoot-Out Evaluation Software 29-046-01 (\$99); Shoot-Out Tutorial (multi-lingual) 29-046-02 (\$69); and the bundle package (-01 & -02) price 29-046-03 (\$149)—all in US dollars. Call 800.633.9876 for more information or stop by Extron's booth #2069.

Extron School and Extron School On the Road Schedules



On the Road

Aug. 12-13.....	Extron School, Sales Class	Anaheim, CA
Aug. 23-24.....	Extron School On the Road	Minneapolis, MN
Aug. 25-26.....	Extron School On the Road	Minneapolis, MN
Sept. 9-10	Extron School, Technical Class	Anaheim, CA
Sept. 28-29	Extron School On the Road	Washington, DC
Sept. 30-Oct. 1	Extron School On the Road	Washington, DC
Oct. 11-12	Extron School International	The Netherlands
Oct. 25-26	Extron School On the Road	Atlanta, GA
Oct. 27-28	Extron School On the Road	Atlanta, GA



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